

Low-Cost LIDAR for Wake Vortex Detection, Phase I

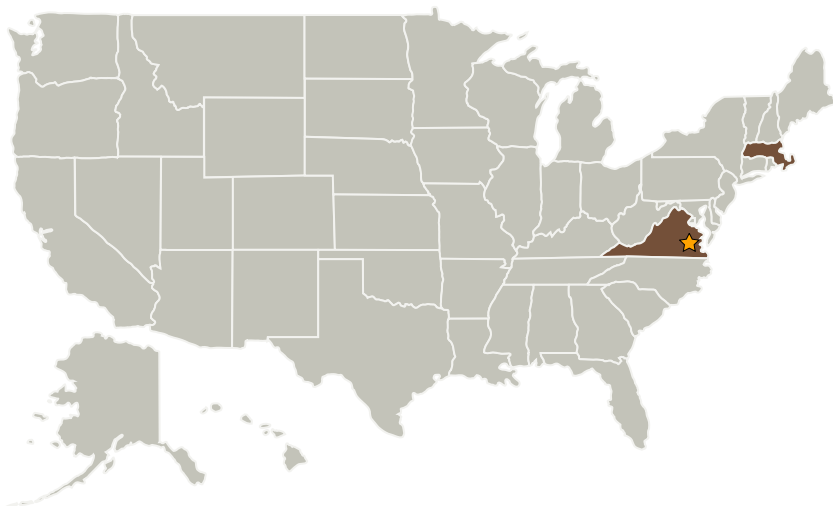
Completed Technology Project (2009 - 2009)



Project Introduction

NASA has been tasked with supporting the development of key technologies to facilitate the evolution of the National Airspace System to NextGen, the Next Generation Air Transportation System. One of these key technologies is the detection of wake vortices generated by other aircraft. This is of particular concern during take-off and landing, both because the danger is particularly acute, and because of the large economic impact of having to widely space the aircraft. About \$5 billion of revenue is lost each year due to delays and lower throughput in our nation's airports. Ground-based lidars have the ability to detect and track wake vortices, but mounting similar systems on aircraft would be prohibitively expensive. We propose to develop an intrinsically low-cost lidar that would be suitable for deployment on commercial airliners. Costs are kept low through an extremely simple design: a passively Q-switched single-frequency laser that uses a fiber delay-line in place of a local oscillator. The Phase I effort will also include a modeling task to explore detecting wake vortices using an on-axis lidar instead of imaging from the side. Since the primary flow components will be perpendicular to the lidar beam, we anticipate that looking for an increase in the width of the coherent return may prove to be the best approach.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Q-Peak, Inc.	Supporting Organization	Industry	Bedford, Massachusetts

Primary U.S. Work Locations	
Massachusetts	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers